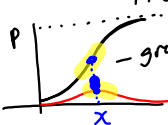


29. $P(x) = \frac{10}{1 + 50(2^{5-1x})}$

a)  x = number of software packages

c) for what values of x is P relatively sensitive steep

d) P when P' is biggest

f) $\lim_{x \rightarrow \infty} P(x) = 10$

Sep 14-8:59 AM

3.5 Derivatives of trig functions

If x is measured in radians then what is dy/dx ?

$y = \sin(x)$	$y' = \cos x$ *
$y = \cos(x)$	$y' = -\sin x$
$y = \tan(x)$	$y' = \sec^2 x$ *
$y = \sec(x)$	$y' = \sec x \tan x$ *
$y = \csc(x)$	$y' = -\csc x \cot x$
$y = \cot(x)$	$y' = -\csc^2 x$

$\frac{d}{dx} \left(\frac{\sin x}{\cos x} \right) = \frac{\cos x \cos x + \sin x \sin x}{\cos^2 x} = \frac{\cos^2 x + \sin^2 x}{\cos^2 x} = \frac{1}{\cos^2 x} = \sec^2 x$

Sep 20-6:42 PM

Find the derivatives of (a) $y = x^2 \sin(x)$ and (b) $y = \cos(x)/(1 - \sin(x))$

a) $\frac{d}{dx} x^2 \sin x = x^2 \cos x + 2x \sin x$

b) $\frac{d}{dx} \left(\frac{\cos x}{1 - \sin x} \right) = \frac{(1 - \sin x)(-\sin x) + \cos x \cos x}{(1 - \sin x)^2}$
 $= \frac{-\sin x + \sin^2 x + \cos^2 x}{(1 - \sin x)^2} = \frac{1 - \sin x}{(1 - \sin x)^2} = \frac{1}{1 - \sin x}$

Sep 20-7:08 PM

If $y = \sec(x)$ find y''

$y' = \sec x \tan x$

$y'' = \sec x \cdot \sec^2 x + \tan x \cdot \sec x \tan x$
 $= \sec^3 x + \tan^2 x \sec x$

Sep 20-7:10 PM

Find the equations of the lines that are tangent and normal to the graph of $y = \tan(x)/x$ at $x=2$. Take derivatives by hand but use your calculator to plug in $x=2$.

$$y = \frac{\tan x}{x} \quad | \quad x=2 = -1.09$$

$$y' = \frac{x \sec^2 x - \tan x}{x^2}$$

tan line

$$y = 3.433(x-2) - 1.09 \quad \text{calc} \quad \frac{x(\sec(x))^2 - \tan(x)}{x^2} \quad | \quad x=2$$

normal

$$y = \frac{-1}{3.433}(x-2) - 1.09 = 3.433$$

$$= -.291(x-2) - 1.09$$

Sep 20-7:12 PM

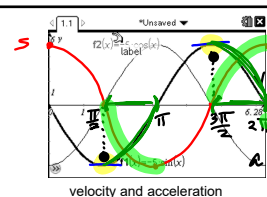
Simple Harmonic Motion

position: $s = 5\cos(t)$

velocity: $v = -5\sin t$

acceleration: $a = -5\cos t$

jerk: $j = 5\sin t$



When is the particle moving fastest?

$$a = -5\cos t = 0$$

$$t = \frac{\pi}{2}, \frac{3\pi}{2}$$

When is the particle slowing down?

when v and acc are opposite signs

Sep 20-7:13 PM

Sep 14-10:29 AM